

DTIC FILE COPY

2

AFOEHL REPORT 90-124EQ00687GHH



AD-A226 283

**Hazardous Waste Technical Assistance Survey
Elmendorf AFB AK**

**PATRICK T. McMULLEN, Capt, USAF, BSC
NANCY S. HEDGECOCK, 1Lt, USAF, BSC**

July 1990

Final Report

**DTIC
ELECTE
SEP 04 1990
S E D**

Distribution is unlimited; approved for public release

**AF Occupational and Environmental Health Laboratory (AFSC)
Human Systems Division
Brooks Air Force Base, Texas 78235-5501**

90 08 31 048

NOTICES

When Government drawings, specifications, or other data are used for any purpose other than a definitely related Government procurement operation, the Government incurs no responsibility or any obligation whatsoever. The fact that the Government may have formulated, or in any way supplied the drawing, specifications, or other data, is not to be regarded by implication, or otherwise, as in any manner licensing the holder or any other person or corporation; or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

The mention of trade names or commercial products in this publication is for illustration purposes and does not constitute endorsement or recommendation for use by the United States Air Force.

The Public Affairs Office has reviewed this report, and it is releasable to the National Technical Information Service, where it will be available to the general public, including foreign nations.

This report has been reviewed and is approved for publication.

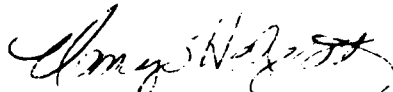
Air Force installations may direct requests for copies of this report to: Air Force Occupational and Environmental Health Laboratory (AFOEHL) Library, Brooks AFB TX 78235-5501.

Other Government agencies and their contractors registered with the DTIC should direct requests for copies of this report to: Defense Technical Information Center (DTIC), Cameron Station, Alexandria VA 22304-6145.

Non-Government agencies may purchase copies of this report from: National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield VA 22161



PATRICK T. MCMULLEN, Capt, USAF, BSC
Chief, Hazardous Waste Function



NANCY S. HEDGECOCK, 1Lt, USAF, BSC
Consultant, Environmental Quality



EDWIN C. BANNER III, Col, USAF, BSC
Chief, Environmental Quality Division

REPORT DOCUMENTATION PAGE			Form Approved OMB No 0704-0188	
<small>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to: Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.</small>				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE July 1990	3. REPORT TYPE AND DATES COVERED Final, 23-26 April 1990		
4. TITLE AND SUBTITLE Hazardous Waste Technical Assistance Survey Elmendorf AFB AK		5. FUNDING NUMBERS		
6. AUTHOR(S) Nancy S. Hedgecock, 1Lt, USAF, BSC Patrick T. McMullen, Capt, USAF, BSC				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) AF Occupational and Environmental Health Laboratory Brooks AFB TX 78235-5501		8. PERFORMING ORGANIZATION REPORT NUMBER AFOEHL Report 90-124 EQ00687GHH		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Same as B1k 7		10. SPONSORING / MONITORING AGENCY REPORT NUMBER		
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Statement A. Unlimited, approved for public release		12b. DISTRIBUTION CODE		
13. ABSTRACT (Maximum 200 words) <p>At the request of HQ AAC/SGPB, the AFOEHL conducted a hazardous waste technical assistance survey at Elmendorf AFB (EAFB) from 23-26 Apr 90. The scope of this survey was to address hazardous waste management practices, explore opportunities for hazardous waste minimization, and to determine possible industrial discharges to the sanitary sewer. The survey team performed a shop-by-shop evaluation of chemical waste management practices as well as met with hazardous waste managers and engineers to discuss the hazardous waste program. Recommendations include: (1) Consider using the analytical services provided by AFOEHL/SA. (2) Convert a small heating unit to burn waste oil. (3) Segregate and recycle JP-4 drained from fuel tanks. (4) Use an absorbent material rather than absorbent pads. (5) Don't treat waste oil and fluid as hazardous waste. (6) Recycle antifreeze.</p>				
14. SUBJECT TERMS Hazardous Waste Program, Elmendorf AFB AK Capt McMullen Management Lt Hedgecock			15. NUMBER OF PAGES 77	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT none	

ACKNOWLEDGMENT

The authors wish to thank the personnel at Elmendorf AFB (EAFB) who provided information and logistic support during the survey. Maj Lindsey Waterhouse, Chief, Bioenvironmental Engineering Services (BES), Alaskan Air Command/SGPB; Capt Rebecca Brown, Chief, BES, USAF Regional Hospital Elmendorf/SGPB; SMSgt Godwin, NCOIC, MSgt Ziv and the entire Bioenvironmental Engineering Services staff were especially supportive of the mission during the survey. We would also like to thank everyone in the BES shop for the local customs orientation on April 26 (otherwise, thanks for the fishfry).

A special note of thanks also to TSgt Michael Wantland who provided extensive support in preparing the waste analysis plan and answered numerous questions on waste analysis.

Accession For	
NTIS GRI&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	



CONTENTS

	Page
SF Form 298	i
Acknowledgment	iii
Illustrations	v
 I. INTRODUCTION	 1
II. BACKGROUND	1
III. PROCEDURE	2
IV. DESCRIPTION OF INDUSTRIAL ACTIVITIES	3
V. SUMMARY OF GENERAL WASTE DISPOSAL PRACTICES	14
VI. FINDINGS AND OBSERVATIONS	15
VII. RECOMMENDATIONS	16
References	22
 APPENDIX	
A Request Letter	23
B Chemical Disposal Survey Form	27
C Accumulation Site Survey Form	37
D Summary of Waste Disposal Practices for Each Waste Category	41
E Summary of Wastes Drummed for Disposal Through DRMO	49
F Master List of Shops	55
G Summary of Waste Disposal Practices by Shop	59
 Distribution List	 71

ILLUSTRATIONS

Table	Title	Page
1	Annual Forecasted Quantities for Waste Categories at Elmendorf AFB	2
2	Suggested Wastestreams	18
3	Example Hazardous Waste Disposal Log	21

I. INTRODUCTION

On 20 Feb 1990, Elmendorf Air Force Base (EAFB) AK requested through HQ AAC/SGPB that the Air Force Occupational and Environmental Health Laboratory (AFOEHL) perform a Hazardous Waste Technical Assistance Survey at EAFB (Appendix A). Base personnel were particularly concerned with hazardous waste management and disposal practices, and waste minimization opportunities.

The survey was conducted by Capt Pat McMullen and Lt Nancy Hedgecock from 23 to 26 Apr 90.

II. BACKGROUND

A. Base Description

Elmendorf AFB is adjacent to Anchorage AK. Elmendorf, headquarters for Alaskan Air Command, is also home of the 11th Tactical Control Wing, 21st Tactical Fighter Wing, 1931st Communications Wing and the Alaskan Air Command Rescue Coordination Center.

B. Hazardous Waste Program

The hazardous waste program at Elmendorf AFB is managed primarily through the Environmental and Contract Planning Office in Civil Engineering, 21 CES/DEEV. The Defense Reutilization and Marketing Office (DRMO) is responsible for contractual removal of wastes. BES helps monitor the program through industrial shop surveys.

Individual shops are responsible for identifying, segregating, handling, packaging, and labeling the wastes generated by their shop. The wastes are usually placed in a 55-gallon drum, bowser or underground storage tank (UST) located either at a satellite accumulation site or at an accumulation site.

When wastes require disposal, the generator completes an AF Form 2005 and submits it to Supply. Supply generates a DD Form 1348-1 using the information contained on the AF Form 2005. The DD Form 1348-1 is then approved by the Environmental Coordinator indicating that funds are available for disposal of the waste. Finally, the generator submits the DD Form 1348-1 to DRMO who arranges for a waste disposal contractor to dispose of the wastes.

Waste oil and fluid are transferred to a rail car. Other wastes are stored at the Treatment, Storage, and Disposal (TSD) Facility until removal from the base. Waste oil and fluid are transferred via rail to Fort Wainwright where it is then sprayed on coal piles before burning. Other wastes are disposed of at a cost to the base.

Wastes are identified by either wastestream analysis or user's knowledge before being transferred to the DRMO Storage Facility. BES is responsible for sampling unknown wastes and other wastestreams on an as needed basis. Samples are sent to the AF Occupational and Environmental Health Laboratory, Analytical Services Division (AFOEHL/SA) or to a local analytical laboratory for analysis.

III. PROCEDURE

The first step of the survey was to review the base's draft hazardous waste management plan, RCRA Part B Permit, ECAMP report, annual RCRA report, and the Bioenvironmental Engineer's hazardous chemical inventory. Each major industrial waste generating activity was then visited. Their industrial operations were observed, disposal practices were discussed, and chemical disposal survey forms (Appendix B) were completed by some shop personnel. These forms provided additional information for subsequent discussions with shop personnel.

Each hazardous waste accumulation site and satellite accumulation site was visited and evaluated by the survey team. The accumulation site survey form is included as Appendix C. The following personnel were contacted about their responsibility and involvement in the hospital hazardous waste program:

Maj Waterhouse, Chief, AAC/SGPB, AV 317-552-4451
Capt Brown, Chief, Bioenvironmental Engineering, SGPB,
AV 317-552-4451
Joe Williamson, Environmental Coordinator, AV 317-552-4157
Steve Flier, Hazardous Waste Specialist, AV 317-552-4157
Sam Swearingen, Defense Reutilization and Marketing Office,
AV 317-552-4950
Mr Whitlock, TSD Facility Operator, AV 317-552-3024

Based on the data from the completed chemical disposal survey forms and discussions with shop personnel, the annual forecasted quantities for nine categories of waste were determined (see Table 1). From Table 1, column 3, the majority of the waste, 47.2%, consists of waste oils and fluids; however, these wastes are not considered hazardous wastes. Thirty-eight percent of the total amount of waste generated is drummed and disposed through DRMO. From Table 1, column 5, 31 percent of the drummed wastes generated are waste fuels.

**Table 1. Annual Forecasted Quantities
For Waste Categories At Elmendorf AFB**

PRODUCT	TOTAL WASTE (GAL/YR)	%TOTAL	TOTAL DRUMMED WASTE (GAL/YR)	%TOTAL
Oils & Fluids	16750	47.2	2980	22.2
Fuels	6213	17.5	4188	31.2
Solvents	3974	11.2	1004	7.5
Paints & Thinners	1282	3.6	1262	9.4
Antifreeze	3185	9.0	2765	20.6
Stripper	480	1.4	480	3.6
Absorbent Pads	137*	-	137*	-
Soaps	3085	8.7	600	4.5
Photo & NDI	<u>486</u>	1.4	<u>150</u>	<u>1.1</u>
TOTAL:	35455		13429	

* Drums/Year (not included in total)

IV. DESCRIPTION OF INDUSTRIAL ACTIVITIES

Industrial Shops: This section details the results of the shop-by-shop chemical usage and disposal practice surveys conducted at the industrial shops. Itemized listings of wastes (including categories, shop, amount of waste, and disposal method) are found in Appendix D. Appendix E lists those wastes drummed for disposal as either hazardous or nonhazardous waste through DRMO. Appendix F contains a master list of shops surveyed and Appendix G contains shop-by-shop listing of waste disposal practices.

A. 21 Equipment Maintenance Squadron (21 EMS)

Shop: AGE Repair
Contact: Mr Draughn

Bldg: 32-127
AUTOVON: 317-552-4579

Shop personnel repair and maintain flight line support equipment for both the 21 TFW and the 616 CAMS. Waste synthetic oil (500 gallons/year), motor oil (700 gallons/year), and hydraulic fluid (100 gallons/year) are drummed and transferred to the POL rail car. The shop has four 55-gallon PD-680 tanks. The PD-680 is periodically recycled through a filtering system which at the time of this survey completely eliminated the disposal of 500 gallons/year of PD-680. Antifreeze (60 gallons/year) is also recycled using a filter press. Aircraft soap (30 gallons/month) is used at the washrack for washing AGE. The washrack drains are connected to an oil/water separator. JP-4 drained from AGE is collected in drip pans and transferred to one of eight 500-gallon flight line bowzers the shop maintains. When full, the fuel in the bowzers is sampled by the fuels lab. The JP-4 (2000 gallons/year) is then recycled into the main base fuel supply.

Shop: AGE Dispatch
Contact: TSgt Boehme

Bldg: 32-127
AUTOVON: 317-552-4579

Shop personnel repair, maintain and dispatch oil and hydraulic fluid carts, and store and dispatch powered AGE for F-15 flight line operations. Waste oil (100 gallons/year), hydraulic fluid (250 gallons/year), and JP-4 (25 gallons/year) are drummed and transferred to the POL rail car.

Shop: Wheel and Tire
Contact: SSgt McDuffie

Bldg: 11-130
AUTOVON: 317-552-4289

Shop personnel assemble, disassemble, and clean aircraft wheels and tires for the F-15 aircraft. The shop has a 200-gallon degreasing tank containing ED-10 and water that is changed out every six months. The waste is drummed, transferred to the TSD facility, and disposed through DRMO as hazardous waste. The shop also has a bearing room that has two 100-gallon tanks containing ED-10 (degreaser) and Slusher Lube All (bearing coating). The tanks are changed out every six months. The waste is drummed, transferred to the TSD Facility, and disposed through DRMO as hazardous waste. Shop rags are taken to linen exchange for cleaning and reissue.

Shop: Corrosion Control
Contact: Mr Knowles

Bldg: 32-050
AUTOVON: 317-552-2792

Shop personnel perform corrosion treatment and painting of F-15 aircraft, associated aircraft parts, and support equipment. Waste enamel and lacquer paint and thinner (55 gallons/month) are drummed, stored at the shop's accumulation site, and disposed as hazardous waste through DRMO. The shop has a 150-gallon hot caustic (mostly sodium hydroxide) strip tank and a methylene chloride cold strip tank. The wastes (15 gallons/month, cold strip, and 25 gallons/month, caustic) are drummed, stored at the shop's accumulation site, and disposed as hazardous waste through DRMO. Glass beads are used for stripping paint from aircraft parts. The waste (1000 lbs/month) is drummed and disposed through DRMO as hazardous waste. Cleaning rags are air dried and disposed as municipal waste.

The shop has a dry filter paint booth. The filters (280 lbs/month) are drummed, stored at the shop's accumulation site, and disposed through DRMO as hazardous waste.

Shop: F-15 Phase Dock
Contact: TSgt Moranda

Bldg: 11-570
AUTOVON: 317-552-4905

Shop personnel perform periodic inspections and maintenance on the F-15 aircraft. Waste oil (50 gallons/month), and hydraulic fluid (50 gallons/month) are drummed, stored at the shop's accumulation site and transferred to the POL rail car. Absorbent pads (2 drums/month), used to clean up spills, are drummed, stored at the shop's accumulation site, and then transferred to the TSD Facility for disposal through DRMO as hazardous waste. Industrial soap (55 gallons/year) is used for cleaning shop floors. The shop floor drains are connected to an oil/water separator. Cleaning rags are disposed as municipal waste.

Shop: Metals Processing
Contact: Mr Close

Bldg: 31-420
AUTOVON: 317-552-5425

Shop personnel perform all certified welding for all Alaskan military installations. Plating operations are no longer performed at the shop. A trichloroethylene vapor degreasing tank is used for cleaning Koch fittings for parachutes. Solids from the tank settle into a sump; the sump waste (12 gallons/year) is disposed through DRMO as hazardous waste. The shop has two alkaline (carbon remover) rust and paint stripping tanks (140 and 160-gallon capacity). The 160-gallon tank contains "clean" product, and the 140-gallon tank contains "dirty" product. The tanks are changed out on as needed basis; the waste is discharged to the sanitary sewer. The sludge is disposed through DRMO as hazardous waste.

The shop has a small glass bead stripping booth that is used for removing paint from small parts before they are welded. The spent glass beads are disposed as municipal waste. Motor oil (20 gallons/year) drained from welding machines and compressors is disposed through DRMO. Used cleaning rags are taken to linen exchange for cleaning and reissue.

Shop: NDI
Contact: SSgt Boles

Bldg: 11-570
AUTOVON: 317-552-5404

Shop personnel perform inspection of F-15 aircraft structural components using dye penetrant, magnetic particle and x-ray inspection methods. Spent x-ray developer (25 gallons/month) is discharged to the sanitary sewer. Spent x-ray fixer (30 gallons/month) is processed through a silver recovery unit before being discharged down the drain to the sanitary sewer.

Dye penetrant inspection is an open system which uses penetrant, detergent and developer. The shop uses a hydrophillic dye penetrant inspection process. Parts are sequentially dipped into the penetrant and detergent, then rinsed and allowed to dry. Next, the part is dipped into the developer, passed through a drying oven, inspected, and rinsed. Spent penetrant (50 gallons/year), emulsifier (50 gallons/year), and developer (50 gallons/year) are drummed and disposed as hazardous waste through DRMO. Rinsewater generated during the inspection process is discharged down the drain to an oil/water separator connected to the sanitary sewer.

The magnetic particle inspection is a closed system utilizing oil containing iron fillings, along with a large magnet to find flaws in aircraft parts. The spent oil solution (15 gallons/year) is drummed for disposal as POL through DRMO. Used cleaning rags are disposed as municipal waste.

B. 21 Component Repair Squadron (21 CRS)

Shop: Engine Repair
Contact: MSgt Axtell

Bldg: 11-110
AUTOVON: 317-552-3124

Shop personnel perform routine maintenance on the F-100C and F-100D engine. JP-4 (16 gallons/month) drained from the engines is collected in buckets, drummed, stored at the shop's accumulation site and transferred to the TSD facility for disposal through DRMO as hazardous waste. Engine oil (55 gallons/month) and hydraulic fluid (4 gallons/month) drained from the engines are collected in buckets, drummed, and transferred to the POL rail car. The shop has a bearing room; however, only minimal amounts of waste are generated here. Citrikleen (5 gallons/month) is used for cleaning shop floors. The shop floor drains are connected to an oil/water separator.

Shop: Hush House
Contact: Mr Hoffner

Bldg: 11-400
AUTOVON: 317-552-2582

Shop personnel perform field tests and engine rev-ups on the F-100 engine. Small quantities of JP-4 that leak from the engines during testing are washed to a floor drain that is connected to an oil/water separator. The oil/water separator is periodically pumped out by Liquid Fuels Maintenance.

Shop: Pneudraulics
Contact: TSgt Neyers

Bldg: 11-570
AUTOVON: 317-552-2093

Shop personnel service, repair, and maintain hydraulic and pneumatic components for the F-15 aircraft. Waste hydraulic fluid (20 gallons/month) is collected in a bucket, drummed, and transferred to the POL rail car. PD-680 (50 gallons/month) is recycled using a filter press. Shop personnel are currently storing hydraulic oil filters and awaiting guidance on proper disposal procedures.

Shop: Battery Shop
Contact: M^r Owens

Bldg: 32-129
AUTOVON: 317-552-3194

Shop personnel maintain all lead-acid and nickel/cadmium (Ni-Cad) batteries used on base. The Alaska Battery Co. has a contract to collect all intact lead batteries. If the case is cracked, the lead-acid electrolyte is drained into a neutralization tank and neutralized with basic electrolyte drained from Ni-Cad batteries. The pH of the solution is checked; the solution is further neutralized with baking soda if needed, and drained through a heavy metal ion exchange unit prior to discharge to the sanitary sewer. All Ni-Cad battery casings and cracked lead-acid battery casings are disposed through DRMO.

Shop: Avionics
Contact: MSgt Pulley

Bldg: 11-120
AUTOVON: 317-552-4055

Shop personnel inspect and repair all F-15 avionics equipment. Waste hydraulic fluid (10 gallons/month) and coolant (10 gallons/month) are drummed separately, stored in the shop's accumulation site and disposed through DRMO as hazardous waste.

C. 21 Civil Engineering Squadron (21 CES)

Shop: Entomology
Contact: MSgt Seward

Bldg: 21-021
AUTOVON: 317-552-3024

Shop personnel perform pest and weed control on Elmendorf AFB. Residual chemicals from triple-rinsing procedures are stored in one of three 30-gallon cans and used for mixing the next batch of chemicals. Empty containers are rendered unusable and disposed as municipal waste.

Shop: Exterior Electric
Contact: SSgt Steele

Bldg: 22-031
AUTOVON: 317-552-2175

Shop personnel are responsible for maintaining all transformers on base. At the time of the survey the base was in the process of establishing a contract to sample approximately 800 transformers, analyze the samples for Polychlorinated Biphenyls (PCBs), and label each transformer according to analytical results. Ten transformers have been taken out of service. Solvents, contained in cable preparation kits, are used in process. The empty aerosol cans are disposed as municipal waste.

Shop: Paint Shop
Contact: Mr Roberts

Bldg: 22-045
AUTOVON: 317-552-2556

Shop personnel perform painting operations on base (e.g., buildings and signs). Waste lacquer thinner, mineral spirits, synthetic thinner, and odorless lacquer thinner (50 gallons/year) are drummed for disposal through DRMO as hazardous waste. Diesel (150-200 gallons/year) used at the end of summer for cleaning road striping equipment is drummed for disposal as hazardous waste through DRMO. The shop has a 300-gallon waterfall paint booth that is drained every six months. The water has been sampled and analyzed; it was determined to be nonhazardous. The sludge (a very small quantity) from the paint booth is drummed along with the paint waste. Dirty cleaning rags are disposed as municipal waste.

The shop has an accumulation site containing five 55-gallon drums used to accumulate waste. The site is located on a covered and diked concrete pad.

Shop: Power Plant
Contact: Mr McFarland

Bldg: 22-004
AUTOVON: 317-552-4697

Shop personnel operate a 22.5 MW electrical power plant which supplies electricity to the entire base. All chemicals used in the plant are neutralized before being discharged to the sanitary sewer.

Shop: Liquid Fuels Maint
Contact: Mr Pullyard

Bldg: 32-139
AUTOVON: 317-552-5342

Shop personnel repair and maintain fixed JP-4 delivery systems. JP-4 (25 gallons/month) is collected in drip pans, drummed, stored at the shop's accumulation point and transferred to DRMO for disposal as waste fuel.

Shop: Heat Shop
Contact: TSgt Robinson

Bldg: 21-044
AUTOVON: 317-552-4655

Shop personnel maintain and repair all heating facilities including individual building heating systems on base. Ethylene glycol (1200 gallons/year) used in steam heating systems is drummed for disposal through DRMO as nonhazardous waste. Corrosion and scale inhibitors (sodium hydroxide, sodium metaphosphate, sodium sulfite, and cyclohexamine) used in the heating system water are analyzed periodically. When spent, the chemicals along with the heating water are discharged to the sanitary sewer.

Shop: Ground Power/Barrier Maint
Contact: MSgt Kelly

Bldg: 32-207
AUTOVON: 317-552-2715

Shop personnel do routine and unscheduled maintenance on flight line arresting barriers and diesel generators used for flight line operations. The shop has a 20-gallon PD-680 tank that is changed every six months. The waste is drummed and disposed through DRMO as hazardous waste. Waste oil and fluid (60 gallons/month) are drummed and transferred to the POL rail car. Waste diesel fuel and MoGas (3 gallons/month) are drummed and disposed through DRMO as waste fuel. Waste antifreeze (20 gallons/month) is drummed and disposed through DRMO.

D. 5099 Civil Engineering Operations Squadron (5099 CEOS)

Shop: Diesel Maint
Contact: Sgt Dalton

Bldg: 21-885
AUTOVON: 317-552-3291

Shop personnel perform depot level maintenance on all AAC diesel generators and aircraft arresting barriers. The shop is divided into several sections: Pump Shop/Component Rebuild Section, Head Section, and Small Rebuild Section. 1,1,1-trichloroethane is used in a pan for cleaning small components; the waste is drummed and disposed through DRMO as hazardous waste. Calibrating fluid (5 gallons/year) used for testing equipment is disposed as waste POL. Two 50-gallon tanks containing diesel are used for cleaning fuel injector parts. One tank contains "clean" product and the other contains "dirty" product. The tanks are changed out quarterly; the waste is disposed as waste fuel through DRMO. The "clean" product is put in the "dirty" tank, and the "clean" tank is filled with new product. A 600-gallon tank containing carbon remover (monoethanolamine) is changed out annually. The waste is disposed through DRMO as hazardous waste.

The "Head Section" has a 100-gallon diesel parts cleaning tank that is changed out semiannually; the waste is disposed as waste fuel through DRMO. The head test unit contains antifreeze; it is replenished as necessary.

The "Small Rebuild Section" has a 110-gallon diesel parts cleaning tank that is changed out quarterly. The waste is disposed as waste fuel through DRMO. Zolve solvent (110 gallons/year) is used for cleaning electrical contacts. The waste is drummed for disposal through DRMO as hazardous waste. Zolve is also used in a small spray booth for cleaning parts. All dirty rags are sent to linen exchange for cleaning and reissue.

The shop's accumulation site is located in a portable metal building. The site contains five 55-gallon drums. The drums contain motor oil (330 gallons/year), Zolve solvent (110 gallons/year), 1,1,1-trichloroethane, diesel (900 gallons/year), and antifreeze (110 gallons/year). Occasionally, waste gasoline (55 gallons/year) and some PD-680 are accumulated at the site.

E. 616 Consolidated Aircraft Maintenance (616 CAMS)

Shop: C-130 Isochronal Maint
Contact: SSgt Breeden

Bldg: Hangar 12
AUTOVON: 317-552-3121

Shop personnel perform periodic maintenance and inspection on C-130 aircraft wings, struts, wheel wells, and the cargo bay. Phase inspections are performed on two C-130 aircraft per month. Drip pans are placed under the engines to contain leaks. Absorbent pads are used to soak up small spills. A small amount of PD-680 (1 gallon/month) is used for cleaning parts. Shop rags are taken to the base laundry for cleaning and reissue.

The 616 CAMS accumulation site is located at Hangar 12. The site has three 500-gallon underground storage tanks (USTs) used for storing waste hydraulic fluid, JP-4, and engine oil. Bowsers brought from the flight line are emptied into the USTs. The JP-4 is reused in AGE, and the waste oil and fluid are transferred to the POL railcar. The tanks fluid levels are checked

monthly with a graduated stick. Each UST is kept locked. Waste paint, thinner, and stripper generated at Corrosion Control is brought daily to the accumulation site and poured into a 55-gallon drum. The waste paints, thinners, and strippers are disposed as hazardous waste through DRMO. Absorbent pads (10-15 drums at the time of the survey) used for soaking up leaks and spills are also accumulated at the site until disposal through DRMO as hazardous waste.

Shop: Propulsion
Contact: TSgt Smith

Bldg: Hangar 15
AUTOVON: 317-552-2681

Shop personnel maintain and repair propeller engines for the C-130 aircraft. One engine and two propellers are serviced per month. Oil (12 gallons/month) drained from the engines is stored in a 150-gallon bowser. When full, the bowser is taken to Hangar 12 and emptied into an UST. Hydraulic fluid (12 gallons/month) drained from the engines and the propeller is stored in 55-gallon drums. The shop has one 50-gallon PD-680 tank that is changed out every two weeks; the waste is drummed and disposed through DRMO as hazardous waste. The drums are stored in the shop in drip pans. When full, the drums are transported to the 616 CAMS accumulation site. Absorbent pads are placed under the engines to contain small spills and leaks. The spent absorbent pads are taken daily to Hangar 12 and put into a drum. Simple Green Soap (150 gallons/year) is used for cleaning the shop floors.

Shop: C-130 and CH-3 Refurbishment
Contact: SSgt Bray

Bldg: Hangar 14
AUTOVON: 317-552-3973

Shop personnel refurbish and paint C-130 and CH-3 interiors. Approximately one C-130 and one CH-3 are refurbished annually. Large parts are painted at 21 FMS Corrosion Control. Small parts are painted using lacquer and polyurethane paint and thinner; the waste (20 gallons/year) is drummed for disposal as hazardous waste through DRMO. Cleaning rags are disposed as municipal waste.

Shop: Corrosion Control
Contact: MSgt Philippe

Bldg: Hangar 14
AUTOVON: 317-552-3874

Shop personnel strip and paint engines, small parts, and small surface areas on the C-130 aircraft. Personnel try to take most parts to 21 FMS Corrosion Control for media blasting rather than using chemical stripper at the shop. Some parts (1-2 per day) are stripped and painted in the shop. The shop does not have a stripping tank; stripper is applied to the part and wiped off. Paint and stripper (5 gallons/month) are accumulated in a 5-gallon can that is emptied daily into a 55-gallon drum stored at the 616 CAMS accumulation site. The shop has a dry paint booth. The filters are changed out every two weeks and disposed as municipal waste.

Shop: CH-3 Pneudraulics
Contact: MSgt Skavland

Bldg: Hangar 14
AUTOVON: 317-552-4554

Shop personnel maintain and repair hydraulic components on the CH-3 helicopter. The shop has one hydraulic servicing cart. Waste hydraulic fluid is taken to the 616 CAMS accumulation site. Empty hydraulic fluid cans are disposed as municipal waste.

Shop: AGE
Contact: TSgt Martinez

Bldg: 42-302
AUTOVON: 317-552-3076

Shop personnel repair, maintain, and dispatch flight line support equipment for C-130 aircraft. The shop has a 20-gallon PD-680 tank that is changed out every 90 days. The waste is drummed, labeled, and taken to the 616 CAMS accumulation site prior to disposal through DRMO as hazardous waste. Hydraulic fluid (1 gallon/day) and engine oil (2 quarts/day) are accumulated in a 5-gallon can that is taken daily to the 616 CAMS accumulation site and emptied into an UST. Spray paint is used for stenciling equipment. The empty aerosol cans are disposed as municipal waste.

ED-10 (55 gallons/month during the summer months, diluted 50:1) is used for washing equipment. Dirty cleaning rags are taken daily to Hangar 12 with their rags for cleaning. The shop does not use any absorbent pads or Speedy Dry.

F. 962 Airborne Warning and Alert Communication System (962 AWACS)

Shop: AMU and AGE
Contact: MSgt Phalson

Bldg: 42-300
AUTOVON: 317-552-2984

Shop personnel maintain two AWACS aircraft and the associated AGE. Waste 7808 oil (50 gallons/year), 30W engine oil (50 gallons/year), and 5606 hydraulic fluid (50 gallons/year) are drummed separately and turned in to DRMO every 90 days. Oil filters are drained and accumulated in a 30-gallon overpack container. They are disposed through DRMO as oil contaminated material. Small quantities of antifreeze are occasionally discharged to the sanitary sewer. Aircraft soap (200 gallons/year) is used for cleaning floors and vehicles. The waste is discharged to the sanitary sewer through an oil/water separator. The shop has just received ED-10 which will be used rather than aircraft soap. The ED-10 will be diluted 50:1 before use.

G. 1369 Audio/Visual Services (1369 AVS)

Shop: Base Photo Lab
Contact: Sgt Metcalf

Bldg: 6-920
AUTOVON: 317-552-2906

Shop personnel provide photographic support to the base. Fixer is circulated through an IMG silver recovery system; developer is drained to the sanitary sewer system. Both shop personnel were new and did not know the quantities of fixer or developer used.

H. Morale, Welfare, and Recreation (MWR)

Shop: Auto Hobby
Contact: Mr Andrus

Bldg: 21-200
AUTOVON: 317-552-3473

The Auto Hobby Shop contains equipment for maintaining and repairing privately owned vehicles. Waste oil (250 gallons/month) is collected in drip pans, and transferred to an UST that is pumped out by CE twice a year. CE transfers the waste oil to the POL rail car. Waste fluid (100 gallons/year) is drummed and transferred to the POL rail car. Waste diesel fuel (30

gallons/ year) used in a parts cleaner is drummed and disposed through DRMO as hazardous waste. The shop has a waterfall paint booth. The water (100 gallons/month) is discharged to the sanitary sewer. Waste paint and thinner (100 gallons/year) are drummed and disposed through DRMO as hazardous waste. Batteries are disposed by the patron. Spent antifreeze (40 gallons/month) is drummed for disposal through DRMO. Shop cleaning rags and Speedy Dry are disposed as municipal waste.

Shop: Aero Club
Contact: Mr English

Bldg: 32-209
AUTOVON: 317-753-4167

Shop personnel maintain Aero Club aircraft. Aviation oil (200 gallons/year) drained from the aircraft is drummed and disposed through Alaska Pollution Control at a cost of 50 cents/gallon. The company samples and analyzes the waste oil every six months. The shop has one 10-gallon degreasing tank containing Chevron solvent that is changed out annually. The waste is also disposed by Alaska Pollution Control. Shop cleaning rags are disposed as municipal waste.

I. 21 Security Police Squadron (21 SPS)

Shop: Indoor Firing Range
Contact: MSgt Langley

Bldg: 22-007
AUTOVON: 317-552-4807

Shop personnel maintain and operate the indoor firing range used for weapons training. Sand (9 cubic yards), used in the target area, is drummed for disposal as hazardous waste (due to lead content) through DRMO. The sand is usually changed out every 18 months.

J. 21 Transportation Squadron (21 TRANS)

Shop: Refueling Maint
Contact: SSgt Jenek

Bldg: 31-338
AUTOVON: 317-552-2538

Refueling maintenance personnel maintain and repair aircraft refueling vehicles. Waste JP-4 (2000 gallons/year), diesel (50 gallons/year), and MoGas (60 gallons/year) are drained to an UST. The waste fuel is pumped from the tank by POL personnel. Since the fuel usually gets contaminated during draining procedures (from dirt and snow on the vehicle), it cannot be recycled. The waste is usually used at the Fire Training Pit (FTP) for training purposes or disposed as nonhazardous waste through DRMO. Waste oil (400 gallons/year) and transmission fluid (50 gallons/year) are drummed and stored at the shop's accumulation site. Waste antifreeze (15 gallons/year) is taken to Vehicle Maintenance and put in a waste antifreeze drum. Dirty cleaning rags are cleaned by a local contractor (Alaska Cleaners).

The shop's accumulation site is located outdoors on a stack of railroad cross ties. The site contains two 55-gallon drums for waste oil and fluid storage.

Shop: Vehicle Maint
Contact: SSgt Johnson

Bldg: 21-900
AUTOVON: 317-552-5511

Shop personnel perform oil changes, lubrication, and routine maintenance on all military vehicles assigned to Elmendorf AFB. Waste motor oil (200 gallons/month) is drained into a 10,000-gallon UST; when full, the waste is pumped from the tank by Refueling Maintenance personnel into a tanker truck. Hydraulic fluid (30 gallons/month), transmission fluid (15 gallons/month), and brake fluid (2 gallon/month) are drummed and stored at the shop's accumulation site. Waste MoGas (10 gallons/month) and diesel (20 gallons/month) are drummed and stored at the shop's accumulation site. The waste fuel is either used for training purposes at the Fire Training Pit or disposed through DRMO. Batteries are taken to the 21 CRS Battery Shop for neutralization. Waste antifreeze (55 gallons/month) is drummed, stored at the shop's accumulation site and disposed through DRMO as nonhazardous waste.

The shop has three, 25-gallon PD-680 degreasing tanks that are changed out every 6 months. The waste is drummed, stored at the shop's accumulation site, and disposed through DRMO as hazardous waste. Simple Green Soap (75 gallons/month, diluted 4:1) is used for cleaning engines and the shop floors. The waste is discharged down the drain to sand traps that are connected to the sanitary sewer. The sand traps are cleaned out every six months; the waste (550 gallons) is drummed and disposed through DRMO as nonhazardous waste. Speedy Dry is drummed along with oil filters and disposed through DRMO as nonhazardous waste. Dirty cleaning rags are cleaned by a local contractor (Alaska Cleaners).

The accumulation site is located outdoors on an impermeable pad. A work order has been submitted to build a dike around the site. Most drums (containing the same type waste) stored at the area are only partially filled (shop personnel from different work areas in the building are reluctant to put their waste in a container that already contains waste).

Shop: Allied Trades
Contact: SSgt Silveira

Bldg: 21-900
AUTOVON: 317-552-3780

Allied Trades personnel repair and paint vehicle bodies. Waste enamel paint (5 gallons/month), dope lacquer thinner (5 gallons/month), acrylic lacquer thinner (1 gallon/month), and acrylic enamel reducer (1 gallon/month) are accumulated in a 5-gallon can. The can is emptied on an as needed basis into a 55-gallon drum that is stored at the accumulation site. The waste is disposed through DRMO as hazardous waste. The shop has two 400-gallon waterfall paint booths that are drained every six months; the dried sludge (20 gallons/year) is disposed as municipal waste.

Shop: Fire Truck Maint
Contact: Mr Saxton

Bldg: 10-875
AUTOVON: 317-552-2223

Shop personnel perform routine and unscheduled maintenance on all fire fighting vehicles. Waste antifreeze (50 gallons/year) is collected in buckets, drummed, and disposed through DRMO. Waste oil and fluid (50 gallons/month) is collected in drip pans, poured through a wall mounted drain which leads to an UST located outside the building. CE pumps out the UST twice a year and transfers the waste oil to the POL rail car.

K. Army Air Force Exchange Service (AAFES)

Shop: Main Services Station
Contact: Mr Peterson

Bldg: 21-876
AUTOVON: 317-753-7120

Shop personnel perform lube and oil changes, cooling system flushes, freeze plug heater repairs, and charge and fill batteries on personal vehicles for AFEES patrons. Approximately 65 oil changes are performed per month. The oil is drained into either of two USTs (1000 and 500-gallon capacity); the tanks are pumped out every six months. Batteries are charged and filled only; a local contractor drains and neutralizes all old batteries (40/month). Spent antifreeze (2000 gallons/year) is recycled using a Wynn's Mark X antifreeze recycling unit. The unit can recycle 15 gallons of antifreeze in 30 minutes. Kim-Wipes are disposed as municipal waste. Brulin Soap (10 gallons/week) is used for cleaning shop floors. The shop floor drains are connected to the sanitary sewer through an oil/water separator.

Shop: Body Shop
Contact: Mr Joseph

Bldg: 31-324
AUTOVON: 317-753-51047

Shop personnel perform repairs on and paint personal vehicles. Waste lacquer paint and thinner (20 gallons/month) is accumulated in a 5-gallon can. The waste is taken to a local contractor for disposal at a cost of \$80 per month.

L. 21 Aircraft Generation Squadron (21 AGS)

Shop: 43rd AMU
Contact: MSgt Pearson

Bldg: 11-470
AUTOVON: 317-552-4809

Shop personnel maintain and issue tools and equipment and perform flight line maintenance on the F-15 aircraft assigned to the 21 TFW. Waste oil and fluid (35 gallons/month) are drummed and transferred to the DRMO rail car for disposal. Absorbent pads soaked with fuel and oil (2 drums/month) are drummed and transferred to DRMO for disposal as hazardous waste. Oil/water separator sludge (2 drums/month) is drummed and stored at the shop's accumulation site until analytical results are received.

Shop: 54th AMU
Contact: MSgt McKinnon

Bldg: 11-670
AUTOVON: 317-552-5732

Shop personnel maintain and issue tools and equipment and perform flight line maintenance on F-15 aircraft assigned to the 21 TFW. Fluid (30 gallons/month) is drummed and transferred to the DRMO rail car for disposal. Fuel and oil soaked absorbent pads (6 drums/month) are drummed and transferred to DRMO for disposal as hazardous waste. Sludge from the oil/water separator (2 drum/month) is drummed and stored at the shop's accumulation site until analytical results are received.

V. SUMMARY OF WASTE DISPOSAL PRACTICES AT ELMENDORF AFB

The waste disposal practices for different categories of waste are summarized in this section. A summary of disposal practices for each waste category is contained in Appendix D.

1. Waste oils and fluids are placed in bowlers, 55-gallon drums or USTs and stored at a designated satellite accumulation site or accumulation site. The waste is transported from the accumulation sites to the TSD facility and stored until it is transferred to a railroad tank car. The waste is then transported by rail to Fort Wainwright and sprayed on coal piles. In some cases, waste oils and fluids are discharged to oil/water separators that are periodically cleaned out by a contractor or CES personnel. Some waste oils and fluids are disposed as hazardous waste through DRMO at a cost of \$3.42/gallon. Waste oils and fluids generated at the MWR Aero Club is taken downtown for disposal through a local disposal company at a cost of \$0.50/gallon.

2. Waste paints and thinners are generally placed in 5-gallon cans or 55-gallon drums and stored at the appropriate accumulation site. The waste is then transported to the TSD facility for storage until it is picked up by a contractor for disposal as hazardous waste. Waste paints and thinners generated at the AAFES Body Shop are taken downtown for disposal through a local disposal company at a cost of \$5/gallon.

3. Most waste JP-4, MoGas, and diesel fuel are disposed through DRMO at a cost of \$3.42/gallon. Fuel contaminated with less than 10% water is used at the Fire Training Pit for training purposes. Fuel drained from aircraft at 616 CAMS is used in AGE.

4. The Alaska Battery Co. picks up spent, intact lead-acid batteries. Lead-acid batteries whose casings are broken and all Ni-Cad batteries are drained into a stainless steel tub and rinsed out with water. The spent electrolyte and rinsewater are discharged to an ion exchange unit for metals removal. After metals removal the electrolyte is neutralized before being discharged down the drain to the sanitary sewer.

5. Waste petroleum-based solvents (e.g., PD-680) are drummed and disposed as hazardous waste through DRMO. Other solvents (e.g., TCA and MEK) are either used in process or drummed and disposed as hazardous waste through DRMO. The 21 EMS AGE Repair shop recycles PD-680.

6. Waste fixers are processed through a silver recovery unit before being discharged down the drain to the sanitary sewer. All other photo chemicals are discharged down the drain to the sanitary sewer.

7. Waste dye-penetrant, emulsifier, and magnetic particle solution generated at NDI are drummed and disposed through DRMO. Waste developer is discharged down the drain to the sanitary sewer.

8. Dirty cleaning rags from most shops are taken to linen exchange for cleaning. Other shops have contracts with local contractors for supplying and cleaning rags. Kim-Wipes or other disposable type cleaning rags are disposed as municipal waste.

9. Paint filters from the dry paint booths at 21 TRANS Allied Trades and 616 CAMS Corrosion Control are disposed as municipal waste. Paint filters from 21 EMS Corrosion Control are disposed as hazardous waste.

10. Absorbent pads, used to clean up small spills, are drummed and disposed through DRMO as oil and fuel contaminated material.

11. Empty aerosol cans are disposed as municipal waste.

12. Waste antifreeze is stored in 55-gallon drums and disposed through DRMO at a cost of \$5.04/gallon. The AAFES Service Station has an antifreeze recycling unit that processes 30 gallons/hour. Shop personnel are pleased with its performance.

13. Rinsewater generated from triple-rinsing pesticide and herbicide containers and cleaning equipment is used for mixing the chemicals. Shop personnel have set up three 30-gallon drums with spigots for storing the triple-rinse water.

14. Soaps and cleaning compounds are discharged down the drain to oil/water separators connected to the sanitary sewer.

15. Chemicals used in Power Plant boilers and in heating and cooling facilities are discharged down the drain to the sanitary sewer.

16. Xylene used in Anatomical Pathology at the Hospital is accumulated in a 30-gallon drum and disposed as hazardous waste through DRMO.

17. Spent glass bead blasting media is disposed as hazardous waste. Baseline waste analyses have been performed; the waste was determined to be hazardous.

18. Waste oil and fuel filters are drummed and disposed through DRMO as oil and fuel contaminated material.

19. Water from waterfall paint booths at 21 CES Paint Shop, 21 EMS Corrosion Control, and MWR Auto Hobby is discharged down the drain to the sanitary sewer. Sludge from the paint booths is drummed along with other paint wastes generated at the shop.

IV. FINDINGS AND OBSERVATIONS

A. DEEV is responsible for training accumulation site monitors. The first training class was recently conducted. The 8-hour class instructed the monitors on the proper procedures for handling and storing hazardous wastes. DEEV plans to give the class semiannually. Many shop personnel are confused about some of the hazardous waste procedures and expressed a need for more one-on-one attention.

B. The TSD facility has a RCRA Part B Permit for storing hazardous waste. The permit is being amended to include a Conforming Storage Facility located at DRMO.

C. The hazardous waste monitors are typically the shop's NCOIC or civilian supervisor. Most monitors hold the rank of E-5 or above.

D. Elmendorf AFB handles all waste disposal for all Alaskan military installations except Eielson AFB and Fort Wainwright. This includes waste from the Coast Guard, Navy, and 11 AF Radar Sites.

E. All hazardous wastes are stored at the TSD facility (Bldg 22-009). CES retains custody of the waste, and DRMO arranges for contractual disposal.

F. DEEV is in the process of establishing a contract for sampling approximately 800 transformers. The contract will also include laboratory analysis and labeling of the transformers based upon the analytical results.

G. Some shops (i.e., CES Power Plant) have a supply of excess unused and used chemicals that are no longer needed. Shop personnel are generally unsure of how to dispose of these wastes and need assistance. Once the excess chemicals are removed, the shops will be better able to properly manage their wastes.

H. The base is unnecessarily managing all waste oil and fluid as a RCRA hazardous waste. Waste oil and fluid is not a hazardous waste unless it is contaminated with an EPA "listed waste" or it is a characteristic hazardous waste (i.e., waste oil contaminated with lead from bearings) (40 CFR Part 261.20 and 261.30). Although uncontaminated waste oil and fluid must be managed properly, it is not subject to the 90-day accumulation times required for hazardous waste (40 CFR Part 262.34). Many shops are turning in uncontaminated waste oil and fluid every 90 days even if the container is not full. This practice is prudent; however, it requires many man-hours and funds to do this. Many shops which are designated as accumulation sites have this designation because of the quantity of waste oil and fluid generated not because of the quantity of hazardous waste generated.

VII. RECOMMENDATIONS

A. Bioenvironmental Engineering should have the responsibility for performing hazardous waste sampling. The draft "Hazardous Waste Management Plan" requires that each hazardous waste generator perform the sampling. Inaccurate sampling procedures can result in inaccurate and misleading analytical results.

B. DEEV should consider using the services provided by AFOEHL for hazardous waste analysis. Several of the analytical reports provided to the base by a local contractor contained erroneous results. Examples include: (1) waste containing 70% acetone with a flash point above 140 degrees F (the flash point of acetone is well below 140 degrees F); (2) oil/water separator sludge containing primarily acetone (this is not possible because acetone is completely soluble in water and would pass through the oil/water separator). A number of analytical results stated that the waste contains acetone. This may be due to contamination in the laboratory.

C. DEEV should also consider using the AFOEHL for material identification (i.e., all waste oil analysis and oil/water separator sludge analysis). Discussions with Maj Waterhouse and Mr Williamson indicate that approximately 200 samples/year could be submitted to the AFOEHL for identification. This would result in a cost savings to the base of \$200,000/year.

D. The base should consider converting a small heating unit to burn waste oil. This would eliminate the need to transport the waste to Fort Wainwright.

E. Shops should properly segregate JP-4 that is drained from fuel tanks. This fuel could then be tested and blended back into the base's main fuel supply or used in AGE rather than disposed. Using 1989 figures, recycling this fuel would save the base approximately \$85,000/year (including disposal cost, drum cost, and new fuel purchase cost).

F. Waste oil and fluid should not be considered a hazardous waste unless it is actually a regulated hazardous waste. Waste oil storage areas should be considered "waste oil storage areas" rather than hazardous waste accumulation sites for regulatory purposes. This practice will reduce the number of regulated accumulation sites and the man-hours involved with hazardous waste management.

G. All shops that use absorbent pads for cleaning up spills should use an alternate absorbent such as one that is siliceous-based. This type absorbent material reduces clean up time, requires less absorbent, and reduces the quantity of oil and fuel contaminated material generated.

H. Spent antifreeze is not a regulated hazardous waste unless it is contaminated with a hazardous waste. The base should consider utilizing the existing antifreeze recycling unit at 21 EMS AGE Repair rather than paying for disposal.

I. The neutralized electrolyte from 21 CRS Battery Shop should be sampled and analyzed to determine if both the ion exchange process and the neutralization process are working properly.

J. Although not required by law, it would be advantageous to Elmendorf AFB to upgrade the accumulation sites with, at a minimum, covers, locking fences, and impermeable, diked surfaces (or if the drums are stored indoors, they should be placed on drip pans). These measures could help prevent the occurrence of environmental pollution incidents.

K. A more comprehensive waste analysis plan is needed to rationally and properly characterize the wastestreams (40 CFR Part 264.13). This plan should consist of: a complete listing of all known wastestreams with a brief description of the process or operation generating the waste; the results of a baseline chemical analysis (to fully characterize the waste); the required analysis frequency; the sampling technique; and the analytical parameters. This type of sampling program will allow the base to establish, within a reasonable time, documented rationale for classifying each wastestream as either hazardous or nonhazardous. Table 2 contains a waste analysis plan for Elmendorf AFB. This list contains both wastes which are routinely drummed and wastes which are discharged to the sanitary sewer. At the time of the survey,

the hazardous waste management practices appeared to be headed in the right direction. Once the management program is fully established (i.e., after more training and personal involvement has taken place and the wastestreams have been properly characterized), we recommend that "user's knowledge" be used for identification of wastes rather than frequent, expensive, laboratory analysis. Periodic sampling will provide documentation of whether or not waste generators are properly identifying and segregating their wastes. A good reference on hazardous waste sampling is "Samplers and Sampling Procedures for Hazardous Waste Streams," EPA-600/2-80-018, Jan 1980.

**Table 2. Annual Analysis Required For Major Wastestreams
Elmendorf AFB AK**

<u>SHOP</u>	<u>WASTESTREAM</u>	<u>TEST METHODS</u>	<u>SAMPLE</u>
AAFES Body Shop	Waste Paint & Thinner	FP, Major Component ID by GC/MS (2)	
AGE	PD 680	FP, SW-8240 Maj Components ID by GC/MS (3)	
All Shops	Sludge from o/w separators	TCLP for metals SW-8240	
Auto Hobby	Waste Paint & Thinner	FP, Major Component ID by GC/MS (2)	
Avionics	Coolanol	FP, SW-8240, Major Component ID by GC/MS (4)	
	Hydraulic Fluid	FP, SW-8240, Major	
Battery Shop	Heavy Metal Reduction System - Effluent	Total Lead and Nickel	
CAMS Corrosion Control	Waste Paint & Thinner	FP, Major Component ID by GC/MS (2)	
CAMS Propulsion	PD 680	FP, SW-8240 Major Component ID by GC/MS (3)	
CE Paint Shop	Paint & Thinner	FP, Major Component ID by GC/MS (2)	
	Diesel Cleaner	FP, SW-8240 (3) Major Component ID by GC/MS, (4)	
	Paint Sludge	Rx, Corr TCLP for metals Component ID by GC/MS (4)	

Table 2 Continued

<u>SHOP</u>	<u>WASTESTREAM</u>	<u>TEST METHODS</u>	<u>SAMPLE</u>
CEOS Diesel Maint.	1,1,1 Trichloroethane Carbon Remover	TCLP metals (4), FP, Corr, FP, Rx, TCLP for Metals, SW-8240 (4), Major Component ID by GC/MS (4)	
	Zolve Solvent	FP, SW-8240 Major Component ID by GC/MS (3)	
Corrosion Control	Waste Paint & Thinner	FP, TCLP for metals Major Components ID by GC/MS	
	Hot Stripper	Corr, Rx TCLP for metals	
	Cold Stripper	Corr, FP, TCLP for metals. Major Component ID by GC/MS (2)	
	Glass Beads	TCLP for metals	
	Paint Filters	TCLP for metals	
Ground Power/ Barrier Maint.	PD 680	FP, SW-8420, Major Component ID by GC/MS (3)	
Metals Processing	Trichloroethylene	FP, SW-8240, Major Component ID by GC/MS (4)	
	Alkaline Carbon Remover	Corr, Rx, FP, TCLP for metals	
	Glass Beads	TCLP for metals	
NDI	Penetrant	FP, SW-8240, Major Component ID by GC/MS; (4)	
	Emulsifier	FP, SW-8240, Major Component ID by GC/MS, (4)	
	Developer	FP, SW-8249, Major Component ID by GC/MS, (4)	
	Mag Particle Oil	FP, Major Component ID by GC/MS, SW-8249 (4)	

Table 2 Continued

<u>SHOP</u>	<u>WASTESTREAM</u>	<u>TEST METHODS</u>	<u>SAMPLE</u>
TRANS			
Vehicle Maint	PD 680	FP, SW-8240 Major Components Id by GC/MS (3)	
Wheel & Tire	ED-10 Degreaser	FP, SW-8240 (1)	
	Slusher Lube All	FP, SW-8240 (1)	

ABBREVIATIONS:

FP - Flash Point SW 1010
 Rx - Reactivity SW 9010, 9030, 9065
 Corr - Corrosivity SW 1110
 TCLP - Toxicity Characteristic Leaching Procedure sw
 GC/MS - Gas Chromatograph Separation, Mass Spectrometer Identification
 O/W - Oil/Water

NOTES:

- (1) SW-8240 requested only if wastestream may have solvent contamination.
- (2) DRMO may not require this test if generator maintains accurate log of all waste added to drum. Check first with DRMO.
- (3) Coordinate with DRMO. If FP < 140 Deg F, waste is already hazardous and further testing may not be required.
- (4) Only if required by DRMO.

L. Waste storage containers should be locked to prevent cross-contamination of wastes. Also, accumulation site managers (including waste oil and fluid managers) should document accumulation site activity by maintaining a log to include: (1) a unique sequence number to identify which wastestream generated the waste (each wastestream in a shop should have a unique number), (2) date, type, and amount of waste put into the drum (see Table 3 for example), and (3) start and stop dates of filling each drum. A uniform system for documentation should be used by all accumulation site managers on base. This type of log can provide documented rationale for using user's knowledge rather than analytical results for waste disposal.

Table 3 Example Hazardous Waste Disposal Log

PAINT SHOP HAZARDOUS WASTE DISPOSAL
LOG FOR DRUM NUMBER: 1

Date	Type of Waste	Amount of Waste	Name & Signature
10 Jun 88	Enamel Paint	1 qt	
10 Jun 88	MEK	1 gal	
15 Jun 88	MEK	1 gal	
20 Jun 88	Polyurethane Paint	1 qt	
25 Jun 88	Poly Thinner	1 gal	
30 Jun 88	MEK	10 gal	
5 Jul 88	Enamel Paint	1 qt	
6 Jul 88	MEK	2 gal	
6 Jul 88	Enamel Paint	1 qt	
7 Jul 88	MEK	2 gal	
8 Jul 88	MEK	2 gal	
9 Jul 88	MEK	2 gal	
11 Jul 88	MEK	2 gal	
13 Jul 88	Enamel Paint	1 qt	
13 Jul 88	MEK	2 gal	
14 Jul 88	MEK	2 gal	
16 Jul 88	Enamel Paint	1 qt	
16 Jul 88	MEK	5 gal	
18 Jul 88	Polyurethane Paint	2 qt	
18 Jul 88	Poly Thinner	3 gal	
20 Jul 88	MEK	4 gal	
21 Jul 88	MEK	1 gal	
28 Jul 88	Enamel Paint	1 gal	
28 Jul 88	MEK	7 gal	

TOTAL: 50 gal

Amounts:

MEK	43.00 gal	86.00%
Polyurethane Thinner	4.00 gal	8.00%
Enamel Paint	2.25 gal	4.50%
Polyurethane Paint	0.75 gal	1.50%

References

1. Samplers and Sampling Procedures for Hazardous Waste Streams, EPA-600/2-80-018, Jan 1980.
2. United States Environmental Protection Agency, "Identification and Listing of Hazardous Waste," 40 CFR 261.

APPENDIX A
Request Letter

(This page left blank)



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ALASKAN AIR COMMAND
ELMENDORF AIR FORCE BASE, ALASKA 99506-5001



FEB 20 1990

REPLY TO
ATTN OF

SGPB (Maj Waterhouse)

SUBJECT

Request for AFOEHL Hazardous Waste Assessment of Elmendorf AFB

TO

AFOEHL/CC

1. The 21 Tactical Fighter Wing Commander, Elmendorf AFB, Alaska has requested a hazardous waste assessment be accomplished by the AFOEHL in an attempt to resolve a number of hazardous waste program discrepancies identified by the Anchorage area office of the Environmental Protection Agency and the Alaska Department of Environmental Conservation (ADEC). Elmendorf AFB was recently proposed for inclusion on the National Priorities List for comparison with Superfund Sites, resulting in increased attention by ADEC on base environmental programs.

2. The base has received Notices of Violation (NOV) for inadequate training of its accumulation point managers, identification of hazardous waste accumulation points and portions of its programs pertaining to hazardous waste management. To date, a hazardous waste stream characterization of each base location using hazardous materials to determine the amount of hazardous waste generated has not been conducted. Additionally, Elmendorf is in the process of updating its RCRA Part B permit.

3. We envision the assessment to be accomplished in two phases. The initial phase would consist of a traditional waste stream characterization. Information is available from the Elmendorf AFB Bioenvironmental Engineering Section on hazardous material information for each industrial workplace, supply hazardous material turn-in roster (M-15) from base supply and semi-annual industrial wastewater pretreatment monitoring data. The second phase of the study would consist of an on site assessment to identify industrial areas for signs of soils contamination and spillage associated with improper hazardous waste storage and handling. This portion of the evaluation would be conducted in the late spring after the snow has melted.

4. If additional time is available we request:

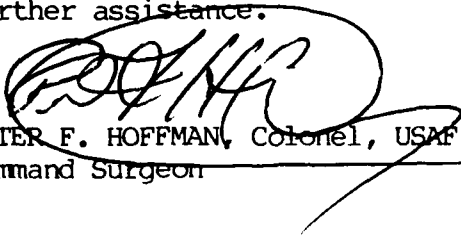
(a) A dye trace study be conducted at 12 locations on base to assess whether a number of unknown hangar drains discharge to the sanitary sewer or to the storm drain. An NOV was assigned by ADEC to the Cherry Hill drainage ditch alleging signs of contamination (foam and oil sheen) believed to originate from one or a number of these locations.

(b) Recommendations be provided based upon the waste characterization study on methods to minimize the amounts of hazardous wastes being generated.

Top Cover for North America

5. Due to existing manning limitations in the 21 Civil Engineering Squadron's Environmental Planning Section and the priority being placed on this program, initiating this survey at your earliest opportunity would be greatly appreciated.

6. My point of contact for this study is Major Lindsey Waterhouse, Command Bioenvironmental Engineer. Please contact him at AUTOVON 317-552-4451 for further assistance.


PETER F. HOFFMAN, Colonel, USAF, MC
Command Surgeon

cc: HQ AAC/DE
HQ AAC/DEPV
HQ AF/SGPA
21 TFW/CC
21 TFW/CV
21 TFW/DEEV

(NY35:HAZWASTE)

APPENDIX B
Chemical Disposal Survey Form

(This page left blank)

PLEASE RETURN THIS FORM TO MAJOR WATERHOUSE AT USAF HOSP/SGPB BY
27 APR 90.

SHOP:

BLDG:

CONTACT:

AUTOVON:

Please fill out this form as accurately and completely as possible. If you have any questions on filling it out, please call Lt Hedgecock at X4282

Examples:

	Tank Capacity	Change Out Frequency	Method of Disposal
PD-680 used in tank	60 gal	4/year	55-gal drum

Comments: 1/2 gal of MEK per month is used as a wipe on/wipe off process for parts cleaning. None is disposed of.

OILS & FLUIDS

	Amt of Waste	Disposal Method
Brake Fluid	6 gal	placed in
Transmission Fluid	10 gal	same 600-gal
Hydraulic Fluid	3 gal	bowser
Motor Oil	50 gal	500-gal UGT
Synthetic Oil	8 gal	55-gal drum

QUESTIONS: If question does not apply to this shop put "N/A" beside it.

1. Does this shop have any underground storage tanks?_____

If yes: How many?_____

Capacity?_____

What is stored in the tank?_____

How often is it cleaned out?_____

Has it ever been leak-tested?_____

2. Do the floor drains of the shop lead to an oil/water separator?_____

If yes: How often is it cleaned out?_____

3. Does the shop have any Safety Kleen units?_____

If yes: How many?_____

Tank capacity?_____

How often are they serviced?_____

4. What does the shop do with dirty rags?_____

5. What does the shop do with used "Speedy Dry"?_____

6. Describe shop activities and responsibilities below:

PAINT WASTE AND THINNERS

FAINTS	Amount of Waste generated/month	Disposal Method
Latex		
Polyurathane		
Enamel		
Other		
Comments		

THINNERS (list below)

Comments

STRIPPERS

Name of Stripper	National Stock #	Amount of Waste per Month	OR Tank Size	Change Out Freq

Comments

ACIDS

Name of Acid	Manufacturer	Amount of Waste generated/month	Method of Disposal
--------------	--------------	------------------------------------	-----------------------

Comments

BATTERIES

Type of Battery	#/Month	Neutralized in Shop or Turned in Wet
-----------------	---------	---

Comments:

SOAPS/CLEANERS

Name of Soap	Dilution Ratio	National Stock#	Amt Used / month	Disposal Method
--------------	----------------	-----------------	---------------------	--------------------

Comments

OILS AND FLUIDS

Amt. of Waste Generated/month	Disposal Method
Brake Fluid	
Transmission Fluid	
Hydraulic Fluid	
Motor Oil	
Synthetic Oil	
Other	
Comments	

SOLVENTS/DEGREASANTS

Name of Chemical	Amt. of Waste OR generated/mo.	Tank Size	Change Out Freq	Disposal Method
Carbon Remover				
PD-680 used in tank				
Pd-680 used on washrack				
Other:				
Comments				

PHOTO CHEMICALS

Name of Chemical	Manufacturer	Amt/mo	OR Size	Tank Size	Change Out freq	Disposal Method

Is the fixer processed through a silver recovery unit before disposal? _____

NDI Chemicals

Name of Chemical	Manufacturer	National Stock #	Tank Size	Change Out Freq	Disposal Method
------------------	--------------	---------------------	--------------	--------------------	--------------------

Emulsifier

Dye Penetrant

Developer

Comments

FUELS

Name of Fuel	Amount/Month	Disposal Method
--------------	--------------	-----------------

ANTIFREEZE

Amount/Month	Disposal Method
--------------	-----------------

OTHER CHEMICALS (Please list any chemicals that contain phenols)

Name of Chemical	Manufacturer	National Stock #	Tank Size	Change Out Freq	Disposal Method
------------------	--------------	---------------------	--------------	--------------------	--------------------

Signature of person filling out this
form _____

(This page left blank)

APPENDIX C

Accumulation Site Survey Form

(This page left blank)

HAZARDOUS WASTE ACCUMULATION SITE INSPECTION FORM

LOCATION: _____
ACCUMULATION SITE MANAGER: _____

DATE: _____
PHONE: _____

ITEM	CONDITIONS	STATUS		COMMENTS
		YES	NO	
STORAGE SITE	Secure			
	Gates Locked			
	Warning Signs			
	No smoking			
	Impermeable Floor			
	Diked/Burmed			
SPILL EQUIPMENT	Valve in Burm to drain water			
	Empty Overpack Container			
FIRE PROTECTION	Materials and Supplies			
	Extinguisher			
STORAGE CONTAINERS	Funnels in Containers			
	Containers Closed			
	Deteriorating			
	Leaking			
	Spills			

Overall Rating of Accumultion Site: _____

LISTING OF WASTES AT ACCUMULTION SITE				
EPA WASTE NUMBER	NUMBER OF CONTAINERS	TYPE OF WASTE	ACCUMULATION START DATE	COMMENTS

(This page left blank)

APPENDIX D

Summary of Waste Disposal Practices for Each Waste Category

(This page left blank)

SUMMARY OF WASTE DISPOSAL PRACTICES FOR EACH WASTE CATEGORY

WASTE: Oil and Fluid

SHOP	WASTE	QTY (GAL/YR)	DISPOSAL
21 EMS AGE Repair	Synthetic	500	FWR
5099 CEOS Diesel Maint	Calibrating Fluid	5	DRMO
21 EMS AGE Dispatch	Hydraulic Fluid	250	FWR
21 EMS Wheel & Tire	Slusher Lube All	200	HW
616 CAMS Propulsion	Oil	144	FWR
616 CAMS AGE	Hydraulic Fluid	300	FWR
21 EMS AGE Dispatch	Motor Oil	100	FWR
21 CRS Pneudraulics	Hydraulic Fluid	240	FWR
616 CAMS Propulsion	Hydraulic Fluid	144	FWR
MWR Auto Hobby	Waste Oil	250	FWR
616 CAMS AGE	Oil	150	FWR
21 CRS Avionics	Hydraulic Fluid	120	DRMO
21 CRS Engine Repair	Hydraulic Fluid	48	FWR
962 AWACS AMU and AGE	Oil Filters	NQ	DRMO
21 AGS 43 AMU	Oil and Fluid	420	FWR
21 CES Ground Power/Barrier Maint	Oil and Fluid	720	FWR
21 TRANS Vehicle Maint	Motor Oil	2400	FWR
21 EMS F-15 Phase Dock	Oil	600	FWR
21 EMS F-15 Phase Dock	Hydraulic Fluid	600	FWR
21 AGS 43 AMU	O/W Sep Sludge	1320	DRMO
21 TRANS Vehicle Maint	Hydraulic Fluid	360	FWR
21 EMS AGE Repair	Motor Oil	700	FWR
21 EMS NDI	Mag Oil Soln	15	DRMO
21 AGS 54 AMU	Oil and Fluid	360	FWR
21 TRANS Fire Truck Maint	Oil and Fluid	600	FWR
MWR Auto Hobby	Fluid	100	FWR
962 AWACS AMU and AGE	7808 Oil	50	FWR
21 TRANS Vehicle Maint	Transmission Fluid	180	FWR
21 AGS 54 AMU	O/W Sep Sludge	1320	DRMO
MWR Aero Club	Aviation Oil	200	REC
21 EMS AGE Repair	Hydraulic Fluid	100	FWR
AAFES Main Service Station	Oil	3000	FWR
21 TRANS Refueling Maintenance	Motor Oil	400	FWR
962 AWACS AMU and AGE	Engine Oil	50	FWR
21 TRANS Vehicle Maint	Brake Fluid	24	FWR
21 CRS Engine Repair	Engine Oil	660	FWR
21 EMS Metals Processing	Motor Oil	20	FWR
21 TRANS Refueling Maintenance	Transmission Fluid	50	FWR
962 AWACS AMU and AGE	Hydraulic Fluid	50	FWR

TOTAL: 16750

SUMMARY OF WASTE DISPOSAL PRACTICES FOR EACH WASTE CATEGORY (Cont'd)

WASTE: Fuel

SHOP	WASTE	QTY (GAL/YR)	DISPOSAL
MWR Auto Hobby	Diesel Fuel	80	HW
21 CRS Engine Repair	JP-4	192	DRMO
21 CES Liquid Fuels Maint	JP-4	300	DRMO
21 TRANS Refueling Maintenance	MoGas	60	DRMO
5099 CEOS Diesel Maint	Diesel	840	DRMO
21 TRANS Vehicle Maint	Diesel	240	DRMO
21 CRS Hush House	JP-4	NQ	OWS
21 TRANS Refueling Maintenance	Diesel Fuel	60	DRMO
21 EMS AGE Repair	JP-4	2000	REC
21 CES Ground Power/Barrier Maint	Diesel and MoGas	96	DRMO
21 TRANS Refueling Maintenance	JP-4	2000	DRMO
21 TRANS Vehicle Maint	MoGas	120	DRMO
21 CES Paint Shop	Diesel	200	DRMO
21 EMS AGE Dispatch	JP-4	25	FWR

TOTAL: 6213

WASTE: Solvent

SHOP	WASTE	QTY (GAL/YR)	DISPOSAL
21 CRS Pneudraulics	PD-680	600	REC
616 CAMS Propulsion	PD-680	1200	HW
5099 CEOS Diesel Maint	1,1,1-Trichloroethane	NQ	HW
21 CES Ground Power/Barrier Maint	PD-680	40	HW
21 TRANS Vehicle Maint	PD-680	150	HW
616 CAMS AGE	PD-680	80	HW
21 CRS Engine Repair	Citrikleen	60	OWS
616 CAMS Isochronal Maint	PD-680	12	HW
5099 CEOS Diesel Maint	Carbon Remover	600	HW
21 EMS Metals Processing	Carbon Remover	600	SS
5099 CEOS Diesel Maint	Zolve	110	HW
21 EMS Metals Processing	Trichloroethylene Sludge	12	HW
21 EMS AGE Repair	PD-680	500	REC
MWR Aero Club	Chevron Solvent	10	REC

TOTAL: 3974

SUMMARY OF WASTE DISPOSAL PRACTICES FOR EACH WASTE CATEGORY (Cont'd)

WASTE: Paint and Thinner

SHOP	WASTE	QTY (GAL/YR)	DISPOSAL
616 CAMS Corrosion Control	Paint	60	HW
AAFES Body Shop	Lacquer P&T	240	HW
21 TRANS Allied Trades	Acrylic Reducer	12	HW
21 EMS Corrosion Control	Enamel & Lacquer P&T	660	HW
21 TRANS Allied Trades	Lacquer Thinner	60	HW
616 CAMS C-130 and CH-3 Refurb	Lacquer & Poly P&T	20	HW
21 TRANS Allied Trades	Enamel Paint	60	HW
21 CES Paint Shop	Paint Sludge	NQ	HW
21 TRANS Allied Trades	Paint Booth Sludge	20	MW
MWR Auto Hobby	Paint and Thinner	100	HW
21 CES Paint Shop	Lacquer Thinner	50	HW

TOTAL: 1282

WASTE: Antifreeze

SHOP	WASTE	QTY (GAL/YR)	DISPOSAL
21 CES Ground Power/Barrier Maint	Antifreeze	240	DRMO
21 TRANS Refueling Maintenance	Antifreeze	15	DRMO
21 EMS AGE Repair	Antifreeze	60	REC
21 CRS Avionics	Coolant	120	DRMO
962 AWACS AMU and AGE	Antifreeze	NQ	SS
21 EMS AGE Repair	Aircraft Soap	360	OWS
21 TRANS Fire Truck Maint	Antifreeze	50	DRMO
MWR Auto Hobby	Antifreeze	480	DRMO
AAFES Main Service Station	Antifreeze	NQ	REC
21 CES Heat Shop	Antifreeze	1200	DRMO
21 TRANS Vehicle Maint	Antifreeze	660	DRMO

TOTAL: 3185

WASTE: Stripper

SHOP	WASTE	QTY (GAL/YR)	DISPOSAL
21 EMS Corrosion Control	Caustic Soln	300	HW
21 EMS Corrosion Control	Methylene Chloride	180	HW

TOTAL: 480

SUMMARY OF WASTE DISPOSAL PRACTICES FOR EACH WASTE CATEGORY (Cont'd)

WASTE: Absorbent Pads

SHOP	WASTE	QTY (GAL/YR)	DISPOSAL
616 CAMS Isochronal Maint	Absorbent Pads	5	DRMO
21 AGS 43 AMU	Absorbent Pads	24	DRMO
21 EMS F-15 Phase Dock	Absorbent Pads	24	DRMO
616 CAMS Propulsion	Absorbent Pads	12	HW
21 AGS 54 AMU	Absorbent Pads	72	DRMO
TOTAL:		137	

WASTE: Battery

SHOP	WASTE	QTY (#/YR)	DISPOSAL
21 CRS Battery Shop	Lead-Acid Electrolyte	NQ	NDD
MWR Auto Hobby	Batteries	NQ	REC
21 CRS Battery Shop	Ni-Cad Electrolyte	NQ	NDD
21 TRANS Vehicle Maint	Batteries	NQ	SBC
21 CRS Battery Shop	Lead-Acid Batteries	NQ	SBC
AAFES Main Service Station	Batteries	480	SBC
TOTAL:		480	

WASTE: Soap

SHOP	WASTE	QTY (GAL/YR)	DISPOSAL
AAFES Main Service Station	Brulin Soap	520	OWS
21 TRANS Vehicle Maint	Simple Green Soap	900	OWS
21 EMS Wheel & Tire	ED-10	200	DRMO
21 EMS Wheel & Tire	ED-10	400	DRMO
616 CAMS AGE	ED-10	660	OWS
21 EMS F-15 Phase Dock	Industrial Soap	55	OWS
962 AWACS AMU and AGE	Aircraft Soap	200	SS
616 CAMS Propulsion	Simple Green Soap	150	UIP
TOTAL:		3085	

SUMMARY OF WASTE DISPOSAL PRACTICES FOR EACH WASTE CATEGORY (Cont'd)

WASTE: Photo and NDI

SHOP	WASTE	QTY (GAL/YR)	DISPOSAL
21 EMS NDI	Penetrant	50	HW
21 EMS NDI	Developer	50	HW
21 EMS NDI	Emulsifier	50	HW
21 EMS NDI	X-Ray Fixer	36	SRDD
21 EMS NDI	X-Ray Developer	300	SS

TOTAL: 486

WASTE: Cleaning Rags

SHOP	WASTE	DISPOSAL
616 CAMS Isochronal Maint	Cleaning Rags	BL
MWR Aero Club	Cleaning Rags	MW
21 EMS Metals Processing	Cleaning Rags	BL
616 CAMS AGE	Cleaning Rags	BL
5099 CEOS Diesel Maint	Cleaning Rags	BL
616 CAMS C-130 and CH-3 Refurb	Cleaning Rags	MW
21 EMS Corrosion Control	Cleaning Rags	BL
AAFES Main Service Station	Kim-Wipes	MW
21 TRANS Vehicle Maint	Cleaning Rags	SBC
21 EMS F-15 Phase Dock	Cleaning Rags	MW
21 EMS Wheel & Tire	Cleaning Rags	BL
21 EMS NDI	Cleaning Rags	MW
21 CES Paint Shop	Cleaning Rags	MW
MWR Auto Hobby	Cleaning Rags	MW
21 TRANS Refueling Maintenance	Cleaning Rags	BL

WASTE: Misc Paint and Stripper

SHOP	WASTE	QTY (GAL/YR)	DISPOSAL
MWR Auto Hobby	Paint Booth Water	1200	SS
21 EMS Metals Processing	Glass Beads	NQ	MW
21 EMS Corrosion Control	Glass Beads	12000*	HW
21 EMS Corrosion Control	Paint Booth Filters	3360**	HW
616 CAMS Corrosion Control	Paint Booth Filters	NQ	MW
21 TRANS Allied Trades	Paint Booth Water	1600	SS
21 CES Paint Shop	Paint Booth Water	600	SS

TOTAL: 3400

* LBS/YR

** #/YR

SUMMARY OF WASTE DISPOSAL PRACTICES FOR EACH WASTE CATEGORY (Cont'd)

WASTE: Entomology

SHOP	WASTE	DISPOSAL
21 CES Entomology	Containers	MW
21 CES Entomology	Triple-Rinse Water	REC

WASTE: Aerosol Cans

SHOP	WASTE	DISPOSAL
21 CES Exterior Electric	Aerosol Cans	MW

WASTE: Speedy Dry

SHOP	WASTE	DISPOSAL
21 TRANS Vehicle Maint	Speedy Dry	DRMO
MWR Auto Hobby	Speedy Dry	MW

WASTE:

SHOP	WASTE	QTY (YD ³ /YR)	DISPOSAL
21 SPS Indoor Firing Range	Sand	9	HW

TOTAL: 9

LEGEND: FWR - USED AT FORT WAINWRIGHT
 DRMO - NONHAZARDOUS WASTE DISPOSED THROUGH DRMO
 SBC - SERVICED BY CONTRACTOR
 NDD - NEUTRALIZED THEN DOWN DRAIN
 REC - RECYCLED
 HW - HAZARDOUS WASTE DISPOSED THROUGH DRMO
 OWS - OIL/WATER SEPARATOR
 BL - BASE LAUNDRY
 MW - MUNICIPAL WASTE
 SS - SANITARY SEWER
 SRDD - SILVER RECOVERY THEN DOWN DRAIN
 UIP - USED IN PROCESS
 NQ - NOT QUANTIFIED

APPENDIX E

Summary of Wastes Drummed and Disposed through DRMO

(This page left blank)

WASTE DRUMMED FOR DISPOSAL THROUGH DRMO

Type of Waste: Oil and Fluid

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
21 EMS NDI	11-570	Mag Oil Soln	15
5099 CEOS Diesel Maint	21-885	Calibrating Fluid	5
962 AWACS AMU and AGE	42-300	Oil Filters	NQ
21 AGS 43 AMU	11-470	O/W Sep Sludge	1320
21 EMS Wheel & Tire	11-130	Slusher Lube All	200
21 AGS 54 AMU	11-670	O/W Sep Sludge	1320
21 CRS Avionics	11-120	Hydraulic Fluid	120

TOTAL: 2980

Type of Waste: Fuel

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
21 CES Paint Shop	22-045	Diesel	200
21 CRS Engine Repair	11-110	JP-4	192
21 TRANS Vehicle Maint	21-900	Diesel	240
21 TRANS Vehicle Maint	21-900	MoGas	120
MWR Auto Hobby	21-200	Diesel Fuel	80
5099 CEOS Diesel Maint	21-885	Diesel	840
21 TRANS Refueling Maintenance	31-338	MoGas	60
21 CES Ground Power/Barrier Maint	32-207	Diesel and MoGas	96
21 TRANS Refueling Maintenance	31-338	Diesel Fuel	60
21 CES Liquid Fuels Maint	32-149	JP-4	300
21 TRA S Refueling Maintenance	31-149	JP-4	2000

TOTAL: 4188

WASTE DRUMMED FOR DISPOSAL THROUGH DRMO

Cont'd

Type of Waste: Solvent

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
616 CAMS Isochronal Maint	H12	PD-680	12
21 TRANS Vehicle Maint	21-900	PD-680	150
5099 CEOS Diesel Maint	21-885	Zolve	110
21 CES Ground Power/Barrier Maint	32-207	PD-680	40
21 EMS Metals Processing	31-420	Trichloroethylene Sludge	12
5099 CEOS Diesel Maint	21-885	1,1,1-Trichloroethane	NQ
5099 CEOS Diesel Maint	21-885	Carbon Remover	600
616 CAMS AGE	42-302	PD-680	80

TOTAL: 1004

Type of Waste: Paint and Thinner

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
MWR Auto Hobby	21-200	Paint and Thinner	100
21 EMS Corrosion Control	32-050	Enamel & Lacquer P & T	660
21 CES Paint Shop	22-045	Lacquer Thinner	50
616 CAMS Corrosion Control	H14	Paint	60
AAFES Body Shop	11-470	Lacquer P&T	240
616 CAMS C-130 and CH-3 Refurb	H14	Lacquer & Poly P&T	20
21 TRANS Allied Trades	21-900	Acrylic Reducer	12
21 TRANS Allied Trades	21-900	Lacquer Thinner	60
21 TRANS Allied Trades	21-900	Enamel Paint	60
21 CES Paint Shop	22-045	Paint Sludge	NQ

TOTAL: 1262

Type of Waste: Antifreeze

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
21 TRANS Vehicle Maint	21-900	Antifreeze	660
MWR Auto Hobby	21-200	Antifreeze	480
21 CES Heat Shop	21-044	Antifreeze	1200
21 TRANS Fire Truck Maint	10-875	Antifreeze	50
21 TRANS Refueling Maintenance	31-338	Antifreeze	15
21 CES Ground Power/Barrier Maint	32-207	Antifreeze	240
21 CRS Avionics	11-120	Coolant	120

TOTAL: 2765

WASTE DRUMMED FOR DISPOSAL THROUGH DRMO

Cont'd

Type of Waste: Stripper

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
21 EMS Corrosion Control	32-050	Methylene Chloride	180
21 EMS Corrosion Control	32-050	Caustic Soln	300
			TOTAL: 480

Type of Waste: Absorbent Pads

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
616 CAMS Isochronal Maint	H12	Absorbent Pads	5
21 EMS F-15 Phase Dock	11-570	Absorbent Pads	24
616 CAMS Propulsion	H15	Absorbent Pads	12
21 AGS 43 AMU	11-470	Absorbent Pads	24
21 AGS 54 AMU	11-670	Absorbent Pads	72
			TOTAL: 137

Type of Waste: Soap

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
21 EMS Wheel & Tire	11-130	ED-10	200
21 EMS Wheel & Tire	11-130	ED-10	400
			TOTAL: 600

Type of Waste: Photo and NDI

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
21 EMS NDI	11-570	Penetrant	50
21 EMS NDI	11-570	Emulsifier	50
21 EMS NDI	11-570	Developer	50
			TOTAL: 150

WASTE DRUMMED FOR DISPOSAL THROUGH DRMO

Cont'd

Type of Waste: Misc Paint and Stripping

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
21 EMS Corrosion Control	32-050	Paint Booth Filters	3360*
21 EMS Corrosion Control	32-050	Glass Beads	12000**

* #/YR

** LBS/YR

Type of Waste: Speedy Dry

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
21 TRANS Vehicle Maint	21-900	Speedy Dry	NQ

Type of Waste: Sand

SHOP	BLD NO.	PRODUCT	QTY (GAL/YR)
21 SPS Indoor Firing Range	22-007	Sand	9

TOTAL: 9

APPENDIX F

Master List of Shops

(This page left blank)

MASTER LIST OF SHOPS

SHOP	CONTACT	BUILDING	EXTENSION
21 EMS			
AGE Repair	Mr Draughn	32-127	552-4579
AGE Dispatch	TSgt Boehme	32-127	552-4579
Wheel and Tire	SSgt McDuffie	11-130	552-4289
Corrosion Control	Mr Knowles	32-050	552-2792
F-15 Phase Dock	TSgt Moranda	11-570	552-4905
Metals Processing	Mr Close	31-420	552-5425
NDI	SSgt Boles	11-570	552-5404
21 CRS			
Engine Repair	MSgt Axtell	11-110	552-3124
Hush House	Mr Hoffner	11-400	552-2582
Pneudraulics	TSgt Neyers	11-570	552-2093
Battery Shop	Mr Owens	32-129	552-3194
Avionics	MSgt Pulley	11-120	552-4055
21 CES			
Entomology	MSgt Seward	21-021	552-3024
Exterior Electric	SSgt Steele	22-031	552-2175
Paint Shop	Mr Roberts	22-045	552-2556
Power Plant	Mr McFarland	22-004	552-4697
Liquid Fuels Maint	Mr Pullyard	32-139	552-5342
Heat Shop	TSgt Robinson	21-044	552-4655
Ground Power/Barrier Maint	MSgt Kelly	32-207	552-2715
5099 CEOS			
Diesel Maint	Sgt Dalton	21-885	552-3291
616 CAMS			
C-130 Isochronal Maint	SSgt Breeden	Hangar 12	552-3121
Propulsion	TSgt Smith	Hangar 15	552-2681
C-130 and CH-3 Refurb	SSgt Bray	Hangar 14	552-3973
Corrosion Control	MSgt Philippe	Hangar 14	552-3874
CH-3 Pneudraulics	MSgt Skavland	Hangar 14	552-4554
AGE	TSgt Martinez	42-302	552-3076
962 AWACS			
AMU and AGE	MSgt Phaison	42-300	552-2984
1369 AVS			
Base Photo Lab	Sgt Metcalf	6-920	552-2906

MASTER LIST OF SHOPS (Cont'd)

SHOP	CONTACT	BUILDING	EXTENSION
MWR			
Auto Hobby	Mr Andrus	21-200	552-3473
Aero Club	Mr English	32-309	753-4167
21 SPS			
Indoor Firing Range	MSgt Langley	22-007	552-4807
21 TRANS			
Refueling Maint	SSgt Jenek	31-338	552-2538
Vehicle Maint	SSgt Johnson	21-900	552-5511
Allied Trades	SSgt Silveira	21-900	552-3780
Fire Truck Maint	Mr Saxton	10-875	552-2223
AAFES			
Main Service Station	Mr Peterson	21-876	753-7120
Body Shop	Mr Joseph	31-324	753-5104
21 AGS			
43 AMU	MSgt Pearson	11-470	552-4809
54 AMU	MSgt McKinnon	11-670	552-5732

APPENDIX G

Summary of Waste Disposal Practices by Shop

(This page left blank)

DISPOSAL PRACTICES BY SHOP AT ELMENDORF AFB

SHOP: 21 AGS 43 AMU

Building: 11-470

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
O/W Sep Sludge	1320	DRMO
Absorbent Pads	24	DRMO
Oil and Fluid	420	FWR
TOTAL: 1764		

SHOP: 21 AGS 54 AMU

Building: 11-670

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
Absorbent Pads	72	DRMO
O/W Sep Sludge	1320	DRMO
Oil and Fluid	360	FWR
TOTAL: 1752		

SHOP: 21 CES Entomology

Building: 21-021

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
Triple-Rinse Water	NQ	REC
Containers	NQ	MW

SHOP: 21 CES Exterior Electric

Building: 22-031

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
Aerosol Cans	NQ	MW

SHOP: 21 CES Ground Power/Barrier Maint

Building: 32-207

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
Oil and Fluid	720	FWR
Diesel and MoGas	96	DRMO
Antifreeze	240	DRMO
PD-680	40	HW
TOTAL: 1096		

SHOP: 21 CES Heat Shop

Building: 21-044

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
Antifreeze	1200	DRMO

TOTAL: 1200

SHOP: 21 CES Liquid Fuels Maint

Building: 32-139

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
JP-4	300	DRMO

TOTAL: 300

SHOP: 21 CES Paint Shop

Building: 22-045

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
Lacquer Thinner	50	HW
Diesel	200	DRMO
Paint Booth Water	600	SS
Paint Sludge	NQ	HW
Cleaning Rags	NQ	MW

TOTAL: 850

SHOP: 21 CRS Avionics

Building: 11-120

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
Hydraulic Fluid	120	DRMO
Coolant	120	DRMO

TOTAL: 240

SHOP: 21 CRS Battery Shop

Building: 32-129

WASTE PRODUCT	QTY(#/YR)	DISPOSAL
Ni-Cad Electrolyte	NQ	NDD
Lead-Acid Batteries	NQ	SBC
Lead-Acid Electrolyte	NQ	NDD

SHOP: 21 CRS Engine Repair

Building: 11-110

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
JP-4	192	DRMO
Hydraulic Fluid	48	FWR
Engine Oil	660	FWR
Citrikleen	60	OWS
TOTAL: 960		

SHOP: 21 CRS Hush House

Building: 11-400

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
JP-4	NQ	OWS

SHOP: 21 CRS Pneudraulics

Building: 11-570

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Hydraulic Fluid	240	FWR
PD-680	600	REC
TOTAL: 840		

SHOP: 21 EMS AGE Dispatch

Building: 32-127

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Motor Oil	100	FWR
Hydraulic Fluid	250	FWR
JP-4	25	FWR
TOTAL: 375		

SHOP: 21 EMS AGE Repair

Building: 32-127

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Synthetic Oil	500	FWR
JP-4	2000	REC
Aircraft Soap	360	OWS
Antifreeze	60	REC
PD-680	500	REC
Hydraulic Fluid	100	FWR
Motor Oil	700	FWR

TOTAL: 4220

SHOP: 21 EMS Corrosion Control

Building: 32-050

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Enamel & Lacquer P&T	660	HW
Caustic Soln	300	HW
Cold Chemical Stripper	180	HW
Glass Beads	12000	HW
Paint Booth Filters	3360	HW
Cleaning Rags	NQ	BL

TOTAL: 16500

SHOP: 21 EMS F-15 Phase Dock

Building: 11-570

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Oil	600	FWR
Industrial Soap	55	OWS
Cleaning Rags	NQ	MW
Absorbent Pads	24	DRMO
Hydraulic Fluid	600	FWR

TOTAL: 1279

SHOP: 21 EMS Metals Processing

Building: 31-420

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Cleaning Rags	NQ	BL
Glass Beads	NQ	MW
Motor Oil	20	FWR
Carbon Remover	600	SS
Trichloroethylene Sludge	12	HW

TOTAL: 632

SHOP: 21 EMS NDI

Building: 11-570

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
Penetrant	50	HW
Cleaning Rags	NQ	MW
X-Ray Fixer	36	SRDD
Mag Oil Soln	15	DRMO
X-Ray Developer	300	SS
Emulsifier	50	HW
Developer	50	HW

TOTAL: 501

SHOP: 21 EMS Wheel & Tire

Building: 11-130

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
ED-10	200	DRMO
Slusher Lube All	200	HW
Cleaning Rags	NQ	BL
ED-10	400	DRMO

TOTAL: 800

SHOP: 21 SPS Indoor Firing Range

Building: 22-007

WASTE PRODUCT	QTY(YD3/YR)	DISPOSAL
Sand	9	HW

TOTAL: 9

SHOP: 21 TRANS Allied Trades

Building: 21-900

WASTE PRODUCT	QTY(GAL/YR)	DISPOSAL
Acrylic Reducer	12	HW
Paint Booth Water	1600	SS
Lacquer Thinner	60	HW
Enamel Paint	60	HW
Paint Booth Sludge	20	MW

TOTAL: 1752

SHOP: 21 TRANS Fire Truck Maint

Building: 10-875

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Antifreeze	50	DRMO
Oil and Fluid	600	FWR
TOTAL: 650		

SHOP: 21 TRANS Refueling Maintenance

Building: 31-338

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Antifreeze	15	DRMO
JP-4	2000	DRMO
Diesel Fuel	60	DRMO
MoGas	60	DRMO
Transmission Fluid	50	FWR
Cleaning Rags	NQ	BL
Motor Oil	400	FWR
TOTAL: 2585		

SHOP: 21 TRANS Vehicle Maint

Building: 21-900

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Hydraulic Fluid	360	FWR
Brake Fluid	24	FWR
PD-680	150	HW
Cleaning Rags	NQ	SBC
Transmission Fluid	180	FWR
Simple Green Soap	900	OWS
MoGas	120	DRMO
Antifreeze	660	DRMO
Motor Oil	2400	FWR
Batteries	NQ	SBC
Speedy Dry	NQ	DRMO
Diesel	240	DRMO
TOTAL: 5034		

SHOP: 5099 CEOS Diesel Maint

Building: 21-885

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Cleaning Rags	NQ	BL
1,1,1-Trichloroethane	NQ	HW
Diesel	840	DRMO
Zolve	110	HW
Calibrating Fluid	5	DRMO
Carbon Remover	600	HW

TOTAL: 1555

SHOP: 616 CAMS AGE

Building: 42-302

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Hydraulic Fluid	300	FWR
ED-10	660	OWS
Oil	150	FWR
PD-680	80	HW
Cleaning Rags	NQ	BL

TOTAL: 1190

SHOP: 616 CAMS C-130 and CH-3 Refurb

Building: H14

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Lacquer & Poly P&T	20	HW
Cleaning Rags	NQ	MW

TOTAL: 20

SHOP: 616 CAMS Corrosion Control

Building: H14

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Paint Booth Filters	NQ	MW
Paint	60	HW

TOTAL: 60

SHOP: 616 CAMS Isochronal Maint

Building: H12

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Cleaning Rags	NQ	BL
PD-680	12	HW
Absorbent Pads	5	DRMO

TOTAL: 17

SHOP: 616 CAMS Propulsion

Building: H15

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Simple Green Soap	150	UIP
Absorbent Pads	12	HW
Hydraulic Fluid	144	FWR
PD-680	1200	HW
Oil	144	FWR

TOTAL: 1650

SHOP: 962 AWACS AMU and AGE

Building: 42-300

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Oil Filters	NQ	DRMO
Antifreeze	NQ	SS
Aircraft Soap	200	SS
7808 Oil	50	FWR
Hydraulic Fluid	50	FWR
Engine Oil	50	FWR

TOTAL: 350

SHOP: AAFES Body Shop

Building: 11-470

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Lacquer P&T	240	HW

TOTAL: 240

SHOP: AAFES Main Service Station

Building: 21-876

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Batteries	480	SBC
Antifreeze	NQ	REC
Oil	3000	FWR
Brulin Soap	520	OWS
Kim-Wipes	NQ	MW

TOTAL: 4000

SHOP: MWR Aero Club

Building: 32-209

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Aviation Oil	200	REC
Chevron Solvent	10	REC
Cleaning Rags	NQ	MW

TOTAL: 210

SHOP: MWR Auto Hobby

Building: 21-200

WASTE PRODUCT	QTY (GAL/YR)	DISPOSAL
Diesel Fuel	80	HW
Paint Booth Water	1200	SS
Fluid	100	FWR
Waste Oil	250	FWR
Cleaning Rags	NQ	MW
Antifreeze	480	DRMO
Batteries	NQ	REC
Paint and Thinner	100	HW
Speedy Dry	NQ	MW

TOTAL: 2210

LEGEND: FWR - USED AT FORT WAINWRIGHT
 DRMO - NONHAZARDOUS WASTE DISPOSED THROUGH DRMO
 SBC - SERVICED BY CONTRACTOR
 NDD - NEUTRALIZED THEN DOWN DRAIN
 REC - RECYCLED
 HW - HAZARDOUS WASTE DISPOSED THROUGH DRMO
 OWS - OIL/WATER SEPARATOR
 BL - BASE LAUNDRY
 MW - MUNICIPAL WASTE
 SS - SANITARY SEWER
 SRDD - SILVER RECOVERY THEN DOWN DRAIN
 UIP - USED IN PROCESS
 NQ - NOT QUANTIFIED

(This page left blank)

Distribution List

	Copies
HQ AFSC/SGP Andrews AFB DC 20334-5000	1
HQ USAF/SGPA Bolling AFB DC 20332-6188	1
HQ AAC/SGPB Elmendorf AFB AK 99506-5001	3
HQ AAC/DE Elmendorf AFB AK 99506-5001	1
USAF Regional Hospital Elmendorf/SGPB Elmendorf AFB AK 99506-5300	1
AAMRL/TH Wright-Patterson AFB OH 45433-6573	1
7100 CSW Med Cen/SGB APO New York 09220-5300	1
Det 1, AFOEHL APO San Francisco 96274-5000	1
USAFSAM/TSK Brooks AFB TX 78235-5301	1
USAFSAM/ED/EDH/EQ Brooks AFB TX 78235-5301	1 ea
Defense Technical Information Center (DTIC) Cameron Station Alexandria VA 22304-6145	2
HQ USAF/LEEV Bolling AFB DC 20330-5000	1
HQ AFESC/RDV Tyndall AFB FL 32403-6001	1
21 CES/DEEV Elmendorf AFB AK 99506-5010	2
HQ HSD/YA Brooks AFB TX 78235-5000	1
OO-ALC/MME Hill AFB UT 84056-5000	1

Distribution List

	Copies
OC-ALC/MME Tinker AFB OK 73145-5000	1
SA-ALC/MME Kelly AFB TX 78241-5000	1
SM-ALC/MME McClellan AFB CA 95652-5000	1
WR-ALC/MME Robins AFB GA 31098-5000	1